

REMARKS

In the Office Action dated May 20, 2004, claims 1-3, 9, 11-16, 21, 23-26, 30 and 32-33 were rejected under U.S.C. §102(b) as allegedly being anticipated by Herley (U.S. Patent No. 5,828,818). In addition, claims 6, 8, 19 and 28 were rejected under U.S.C. §103(a) as allegedly being unpatentable over Herley in view of Zhang et al. (U.S. Patent No. 6,731,794). Furthermore, claims 4-5, 7, 10, 17-18, 20, 22, 29 and 31 were rejected under U.S.C. §103(a) as allegedly being unpatentable over Herley in view of Tao (WO 01/26359).

In response, Applicants respectfully assert that the cited references of Herley, Zhang et al. and Tao do not disclose all the recited limitations of the claimed invention. Consequently, the pending claims 1-33 are neither anticipated by Herley nor obvious in view of Herley and Zhang et al. or Tao. In view of the following remarks, Applicants respectfully request the allowance of the pending claims 1-33.

A. Patentability of Independent Claims 1, 13 and 24

The independent claim 1 recites "*[a] method of demosaicing a mosaiced image comprising: receiving said mosaiced image, said mosaiced image being a representation of a scene of interest; and processing said mosaiced image using a demosaicing operator on blocks of said mosaiced image to derive a representation of a demosaiced image, said demosaicing operator incorporating a frequency-based transformation operator to take into account a subsequent frequency-based compression process.*"

The Office Action has rejected the independent claim 1 under U.S.C. §102(b) as allegedly being anticipated by Herley. Specifically, the Office Action has alleged that Herley discloses the claimed limitation of "*processing said mosaiced image using a demosaicing operator on blocks of said mosaiced image to derive a representation of a demosaiced image, said demosaicing operator incorporating a frequency-based transformation operator to take into account a subsequent frequency-based compression process.*" Applicants respectfully disagree.

The cited reference of Herley describes a compression method and apparatus that operates on interpolated image. As clearly described in column 5, lines 31-45, and shown in Fig. 5 of Herley, the "compression process" of Herley involves taking an interpolated image (500) and then iteratively compressing (510) and decompressing (520) until the image resulting after compression and decompression is close enough to the image before compression. Similarly, as described in column 5, line 46, to column 6, line 4, and shown in Fig. 6 of Herley, the "compression apparatus" of Herley operates by taking an input image (610) and then iteratively compressing and decompressing using the compressor (630) and the decompressor (650), respectively, until the comparer (650) determines that the image stored in the uncompressed image store (620) is close enough to the decompressed image from the decompressor (650). Although the input image (610) is not further described in Herley, it can be assumed to be an interpolated image since raw or mosaiced image is interpolated before being compressed, as described in column 2, lines 51-60, and shown in Fig. 1 of Herley. Thus, the method and apparatus of Herley involves processing an image that has been interpolated or demosaiced.

In asserting that Herley discloses the claimed invention of the independent claim 1, the Office Action has referenced certain figure elements and passages of Herley. In particular, the Office Action has referenced "col. 4 line 65-col.5 line 30" of Herley to show that the claimed limitation of "*said demosaicing operator incorporating a frequency-based transformation operator to take into account a subsequent frequency-based compression process*" is disclosed in Herley.

Although the referenced passage (column 4, line 65, to column 5, line 30) of Herley seems to be related to the claimed limitation, the passage actually sets forth a hypothetical basis for the mosaiced image compression process of Herley. This is clearly evident in column 5, lines 7-11, of Herley, which states:

"In fact of course we can probably not satisfy both constraints, and will settle for approximately satisfying the first. It is not immediately apparent how this can be achieved however."

Herley then apparently describes how to achieve this approximation in column 5, lines 12-30. Careful reading of this section of Herley reveals the focus of the

compression process and apparatus of Herley, which involves iteratively JPEG encoding (compressing) and JPEG decoding (decompressing).

The passage of Herley referenced in the Office Action, i.e., column 4, line 65, to column 5, line 30, does not disclose "*said demosaicing operator incorporating a frequency-based transformation operator to take into account a subsequent frequency-based compression process*", as recited in claim 1. This passage merely sets forth the desired effect of color interpolation, which can be achieved by the compression process, as set forth and asserted in Herley. The mention of "DCT coefficient" in the referenced passage of Herley does not relate to a demosaicing or interpolating process but rather to compressing and decompressing process as illustrated in column 5, lines 11-14, which states:

"First, suppose that we color interpolate, JPEG compress and decompress. Call this image (R' , I_0' , I_1'). The resulting image certainly satisfies the first property (recall all JPEG decompressed images have this property)..."

The "first property" refers to the requirement that "DCT coefficients of the image should equal quantizer reconstruction levels". Thus, the reference passage does not disclose "*said demosaicing operator incorporating a frequency-based transformation operator*", as recited in claim 1.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegual Bros. v. Union Oil of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Since the cited reference of Herley does not disclose the claimed limitation of "*said demosaicing operator incorporating a frequency-based transformation operator*", the independent claim 1 is not anticipated. Therefore, Applicants respectfully request that the independent claim 1 be allowed.

The above remarks regarding the independent claim 1 are also applicable to the independent claim 13, which recite similar limitations, and to the independent claim 24, which recited similar limitations with respect to a system for processing a mosaiced image. Therefore, Applicants respectfully assert that claims 13 and 24 are also not anticipated by the cited reference of Herley.

B. Patentability of Dependent Claims 2, 3, 14, 15 and 25

The Office Action has also rejected the dependent claims 2, 3, 14, 15 and 25 under U.S.C. §102(b) as allegedly being anticipated by Herley. Specifically, the Office Action has alleged that “Herley further discloses the demosaicing operator uses a color space operator for converting an original color space RGB to a different color space (YCrCb) (col. 3 lines 9-10 and line 49).”

The cited passage of Herley states that “it is first necessary to transform to a luminance/chrominance space such as YUV or YCrCb.” However, as stated in column 3, lines 11-12, of Herley, “[t]o carry out this transformation it is first necessary to demosaic the image to have a full 24-bit image.” Thus, the color transformation is performed after demosaicing an image. Consequently, Herley does not disclose a “demosaicing operator” that includes “a color space conversion operator”, as recited in claims 2, 3, 14, 15 and 25. Therefore, the dependent claims 2, 3, 14, 15 and 25 are not anticipated by the cited reference of Herley.

C. Patentability of Dependent Claims 9, 21 and 30

The Office Action has also rejected the dependent claims 9, 21 and 30 under U.S.C. §102(b) as allegedly being anticipated by Herley. Specifically, the Office Action has alleged that “Herley further discloses DCT transformation (col. 3 line 42).”

The cited passage of Herley does disclose DCT transformation. However, the disclosed DCT transformation is related to compression, not interpolation or demosaicing. Thus, while Herley discloses DCT transformation, Herley does not disclose a “*demosaicing operator incorporating a frequency-based transformation operator*” in which the frequency-based transformation operator is “*a DCT-based transformation operator*”, as recited in claims 9, 21 and 30 (which depend on claims 1, 12 and 24, respectively). Therefore, the dependent claims 9, 21 and 30 are not anticipated by the cited reference of Herley.

D. Patentability of Dependent Claims 4, 5, 17, 18 and 27

The Office Action has rejected the dependent claims 4, 5, 17, 18 and 27 under U.S.C. §103(a) as allegedly being unpatentable over Herley in view of Tao. Although, the dependent claim 27 is not specifically mentioned in the Office Action, Applicants have assumed that claim 27 is similarly rejected since it recites similar limitations as that of claims 4 and 17. In support of this rejection, the Office Action has cited page 11, lines 6-10, of Tao, which is alleged to disclose the claimed limitations of claims 4, 5, 17 and 18.

The cited passage of Tao states that “the wavelet filtering used in the demosaicing step 74 should be chosen such that the high frequency band signals in the wavelet compression will be small and close to zero.” However, Tao does not disclose “*defining selected coefficients of transformation-related coefficients as being equal to zero*” (emphasis added), as recited in claims 4, 5, 17, 18 and 27. Therefore, the dependent claims 4, 5, 17, 18 and 27 are not obvious in view of Herley and Tao.

E. Patentability of Dependent Claims 7 and 20

The Office Action has also rejected the dependent claims 7 and 20 under U.S.C. §103(a) as allegedly being unpatentable over Herley in view of Tao. In support of this rejection, the Office Action has alleged that the feature of using Bayesian rule “is notoriously well known in the art” and that “[i]t would have been obvious to one of ordinary skill in the art at the time the invention was made to use the scheme of Bayesian rule in the method of Herley in order to obtain efficient compression and reduce the artifacts.”

In rejecting claims 7 and 20, Applicants believe that the Office Action has assumed that Bayesian rule is related to a Bayer pattern. Bayesian rule is related to probabilistic distributions and is not related to a Bayer pattern. Therefore, the basis for the alleged rejection is in error and the dependent claims 7 and 20 are not obvious in view of Herley and Tao.

I. Patentability of Dependent Claims 6, 8, 10-12, 16, 19, 22, 23, 26, 28, 29 and 31-33

Each of the dependent claims 6, 8, 10-12, 16, 19, 22, 23, 26, 28, 29 and 31-33 depends on one of the independent claims 1, 13 and 24. As such, these dependent claims include all the limitations of their respective base claims. Therefore, Applicants submit that these dependent claims are allowable for at least the same reasons as their respective base claims.

Applicants respectfully request reconsideration of the claims in view of the remarks made herein. A notice of allowance is earnestly solicited.

Respectfully submitted,



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